SUPERFREEZE®

ELECTRONIC LIQUID LEVEL CONTROLLER

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TYPE : 38 SLC

REFRIGERANTS

Suitable for all common non-flammable refrigerants including R-717(Ammonia),R-12,R-22, R-502 and non-corrosive gases and liquid.

FEATURES

- DIN,ANSI and FPT/NPT flanges.
- Float chamber can be installed in any location.
- Electronically operated remote control mechanism.
- Counter flanges are included.

INTRODUCTION

Liquid level controllers 38SLC are used to regulate the liquid level in a vessel or a flooded coil, the level controller consist of float chamber and an electronic controller. A level indicator module is also mounted on the controller consisting of LED's operating in bar graph mode. The indicator displayed the rising and falling of liquid level inside the float chamber.

Liquid level controller 38SLC is used to regulate the liquid level for example:-

1. Flooded evaporators.
2. Low pressure pump tanks in pump re-circulation systems.
3. Pump tanks in gas pump systems.
4. Intermediate coolers in two stage refrigeration plant.
5. Condensers.

The 38SLC can also be used as a protection against too- high or too- low liquid levels.

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TECHNICAL SPECIFICATION

1. Maximum Operating Pressure : 21 bar (300 psig)
2. Max. test pressure for float housing : 29bar
2. Operating temperature range : -45°C to +55°C
3. Max. permissible ambient temperature for controller : +55°C
4. Enclosure : IEC 529 0R DIN 40050
5. For Float housing : IP 65
6. For Controller housing : IP 55
6. Screwed cable entry for float housing : One entry
5. For Controller housing : Three entries
6. Liquid level differential : 10 to 40mm (5 give 40mm and 1 give 10mm).
7. Voltage supply : 230V 50Hz or 110V 50Hz (if any other plz. contact factory)
8. Permissible Voltage Variation : +10% to -15%

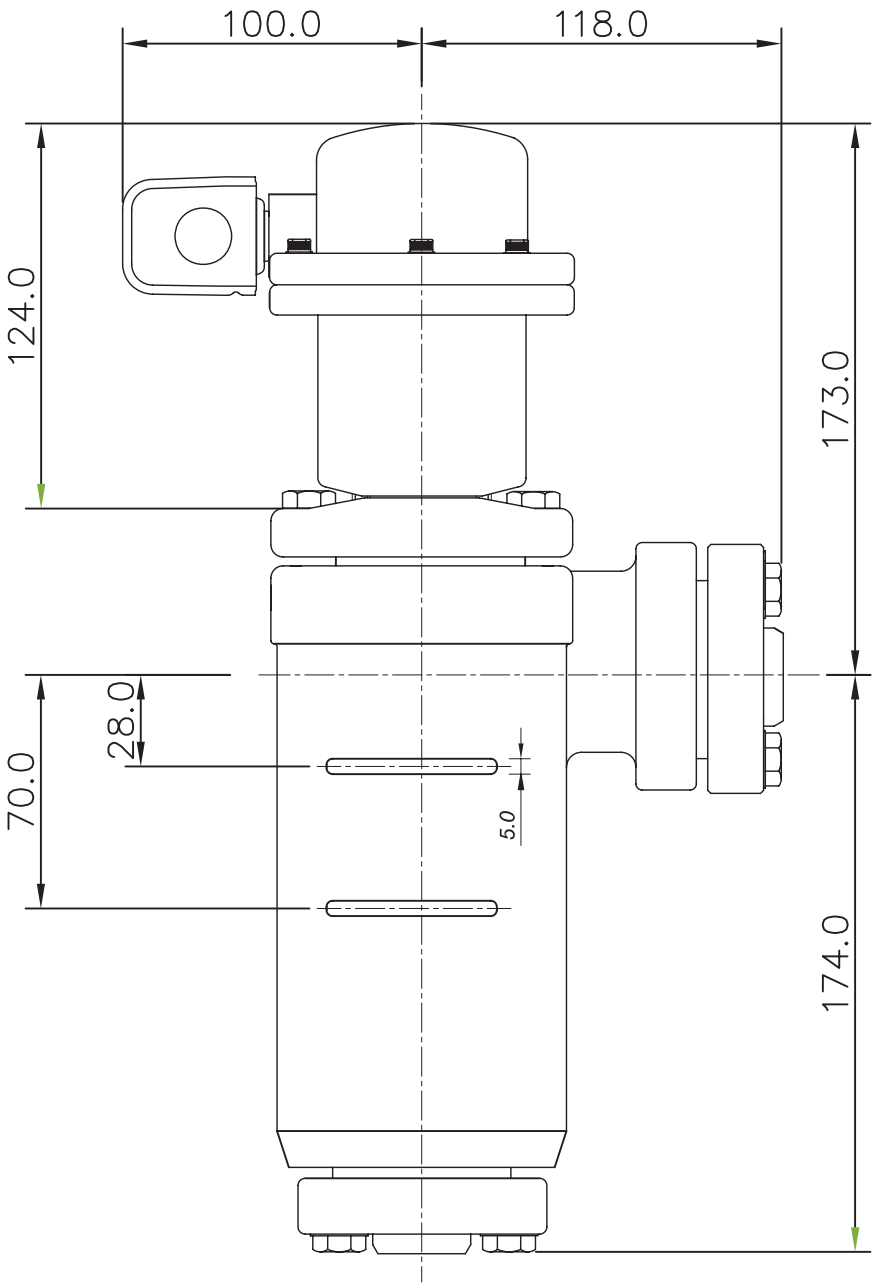
Note

The current in the pilot coil is max. 0.02A. The voltage between its supply leads terminal 2&4 are max. 20VAC.
Earthling one of the coil leads will not affect the operation of the controller
The contacts can break a circuit of max.230VAC. 10A resistive load
The cable length of the pilot coil has no significance to the operation of the controller

APPLICATION

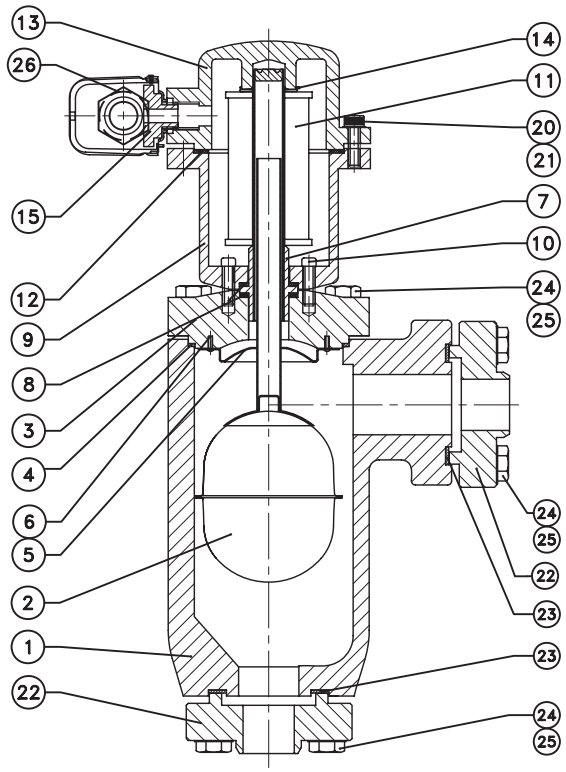
- Vertical Accumulator.
- Flooded chiller with Surge Drum.
- Ammonia air Cooling unit.
- Condensers

DIMENSIONS



LIQUID LEVEL CONTROLLER (38SLC)
ASSEMBLY

PART LISTS



LIQUID LEVEL CONTROLLER (38SLC)
ASSEMBLY

ITEM NO.	DESCRIPTION	PART NO.	QTY.
26	CONNECTOR	9103661R3	01
25	SPRING WASHER B-12.2	SWB12S9	12
24	HEX. BOLT M12X1.75,L40	HSM12L40S9	12
23	GASKET	9003114260R2	02
22	FLANGE	900318S7	02
21	SPRING WASHER B-6.2	SWB6S9	06
20	HEX. SOCKET HEAD SCREW M6X20	ASM6L20S9	06
15	HOUSING NUT	910323S7	01
14	SPRING	910319S12	01
13	HOUSING CAP	910343C2	01
12	GASKET	9103116075R2	01
11	COIL	910347NF5	01
10	HEX. SOCKET HEAD SCREW M6X25	ASM6L25S9	04
9	COIL HOUSING	910342C2	01
8	GASKET	9003112227R2	02
7	ENCLOSING TUBE ASSEMBLY	910322S11	01
6	RIVET (SNAP HEAD)	RD2L5S9	04
5	DISH	900333S11	01
4	GASKET	9003117480R2	01
3	BONNET	910302C2	01
2	FLOAT ASSEMBLY	910331S11	01
1	BODY	900301C2	01

INSTALLATION

To make sure that the electronic controller has not been damaged or put out of adjustment due to rough handling in shipping, the entire unit may be tested before installation by using the following procedure:

Place the float chamber upright and connect the two electrical leads to the terminals marked float coil on the electronic controller. Turn the level control dial to position 3 and the differential control dial to position 1. Connect the terminals marked 'LINE' to a 230 Volts 50 cycle AC. Insert any rod in the bottom connection of the float chamber and gently raise and lower the float ball, Observing the action of the neon light. As the ball is raised to, approximately the mid position of its travel, the neon light should go out. When the ball is lowered approximately ½" the neon light should go 'ON'. If you wish, by turning the control dials you may raise or lower the level or increase the differential.
It should be noted that differential level knobs should be set such that the sum of the two settings is '5'. The table below may be referred to :L+D<5. The bar graph Indicator (optional) provided on controller will replicate the change in level by switching 'ON/OFF.'

LEDS

Level	0	1	2	3	4	5
Differential	5	4	3	2	1	0

Increase of differential is necessary to obtain steady operation and decrease hunting. For normal flooded applications **level setting** '1' and **differential setting** '3' gives **satisfactory performance**. **Differential setting** '5' gives **40mm differential** and **differential setting** '1' gives **10mm differential.** The liquid level controller with bar graph indicator module installed on the controller will be of great assistance in making these adjustments. When installed in the system to be controlled, the 230 volts, 50 cycle AC line supplying the electronic controller is protected with a 0.3Amp. Fuse assuming load of standard Solenoid coil. In case of higher load the fuse rating should be suitably altered. The load circuit should be protected by a fuse sized in accordance with the connected load. It is not necessary to fuse the low voltage circuit to the float coil.

WARNING
The level controller float chamber must always be mounted VERTICALLY and its location in relation to the chamber or evaporator must be such that the desired liquid level will fall within the high and low horizontal level marks provided on the float chamber.
The level controller float chamber must be connected to the evaporator or surge drum by **short full** sized '1' lines **separate from other feed connection.**

The vent opening on the side of the float chamber prevents it from becoming GAS BOUND, This vent **must be** connected to the evaporator or surge drum **at a point well above the liquid level.**

Although not necessary, full opening hand stop valves are recommended for installation in both the liquid and vent lines so the float chamber may be removed for cleaning- When necessary, without pumping down the system. When the hand stop valves are installed in horizontal lines, their stems must be in a HORIZONTAL PLANE, to allow these valves to be free draining and prevent no obstruction to gravity flow.

If the level controlled is used for controlling the flow of liquid refrigerants, always install solenoid liquid valve of the proper size in the liquid line.

A hand expansion valve must always be installed on the outlet side of the solenoid liquid valve. The use of this hand expansion valve is imperative. Since the solenoid valve is either fully open or fully closed.

The hand expansion valve provides a means of regulating the rate of flow of the refrigerant into the flooded unit to permit gravity equalization of level in float chamber. **Set the hand expansion valve at full load so that the solenoid liquid valve remains in the open position approximately 80% of the time, and thereby provides smooth flow of liquid refrigerant to the evaporator.**

For stable control on cooling application, the float chamber and connecting liquid and vent lines must be insulated. This will reduce the boiling action of liquid in the float chamber, allowing the float ball in the housing to raise and lower with the liquid level in a steady manner and provide smooth control. Never insulate the coil housing and always provide sufficient room for removal of its cap.

WIRING AND MOUNTING INSTRUCTIONS

The controller enclosure is provided with P G 11.5 cable glands for electrical connections. Six terminals are provided inside the controller. Two terminals namely (1) and (2) are to be connected to a 230 volts, 50 cycle AC line, Terminal namely (3) is provided for earthening , two terminals namely (4) and (5) are provided for the leads from the float coil in the float chamber and two terminals namely (6) and (7) are provided for solenoid valve to be connected directly to these terminal. The controller may be mounted at any REMOTE location in the standard manner.

1, 2 } 230 V AC 50 Hz 3 } Earth 4, 5 } Float (Coil) 6, 7 } Solenoid Valve

Electronic control of liquid level by the controller is maintained by opening the normally closed relay contact circuit as the liquid level rises and by closing the normally closed relay contact, when the liquid level falls.

Neon indicator on front side is connected internally in parallel to solenoid terminals. Hence indicates 'ON' or 'OFF' position of supply connected to solenoid and hence supply of refrigerant. The electronic controller enclosure is provided with four holes at the side for mounting purposes. Mounting is completed by inserting screws through the four holes. DO NOT REMOVE ELECTRONIC CONTROLLER FROM HOUSING.

SERVICING

To remove the float chamber from the system, close the hand stop valve on the bottom liquid connection, allowing the liquid refrigerant in the float chamber to evaporate or to boil out then close the hand 'stop' valve in the vent line, and disconnect all electrical connections and the liquid and vent pipes . To inspect or clean the float ball chamber remove the four cap screws the coil housing assembly and the float chamber gasket. The float assembly can then be removed and cleaned along with the inside of the float chamber.

TROUBLE SHOOTING FOR LEVEL CONTROLLERS

The Neon indicator of liquid level controller indicates the 'ON' or 'OFF' position of Solenoid valve . In the proper installation the 'ON-OFF cycle of the Controller is controlled by adjustment of Hand expansion valve. The hand expansion should be set such that the Solenoid valve is 'ON' for '10' to '20' minute approximately. These timings are only indicative and might very in particular application depending upon seasonal conditions and loading and defrosting condition. **The golden rule is that the hand expansion should be set at full load such that Solenoid liquid valve remains in the open position approximately 80% of the time and thereby provides smooth flow of liquid refrigerant to the evaporator.**

This will avoid flood back due to surging and short cycling of the Solenoid valve. Increase the hand expansion setting quarter thread per hour until the float is full of liquid. This be tested by ice formation on the float chamber and if hand is sticking on the float chamber. Then it definitely indicates the presence of liquid Ammonia inside or simply by monitoring LED display connect 230V AC supply to the controller keep the level knob and the differentional knob of electronic control panel on (2) and (2) respectively. Keep the coil connections intact and open the cap of the float chamber. Remove the coil from the float chamber keeping the connections intact the dummy float consist of a pipe which has magnetic properties identical to the pipe attached to the float and the movement of the float can be simulated by inserting the dummy pipe inside the coil. Where as **Bar Graph display module** indicates the movement of liquid level inside the float chamber.

When the pipe is completely inside the coil it simulates the float chamber being full with liquid and the ball being lifted up completely pushing, the magnetic pipe inside the pick-up coil. The Neon should go **'OFF.' (all LED's Glow)** stopping the liquid Ammonia through the Solenoid. If it does not go 'OFF', then open the coil circuit by disconnecting either terminal '3 'or terminal '4' (pick-up coil) of the connections on connection strip. Then the Neon indicator should go 'OFF'. Now, if it does not go 'OFF', then look for fault (a)-(iii). If it goes 'OFF' then look for fault (a) (ii) however, if the insertion of dummy pipe in the coil makes the Neon go 'OFF' then remove the pipe. Now if it becomes '**ON**' (only **one or two LED's Glow**) then coil and electronic unit are not faulty. Then check for faults (c)-(i) and (c)-(ii) given below. Also if the Neon is continuously 'OFF', cheek for the faults (b)-(i)and (b)-(ii).

(a).**Neon indicator is continuously 'ON'**

(The LED display module indicates **only one or two LED's ON)**

(i).Check Receiver liquid level. May be too low.

(ii).Float coil and coil wiring are faulty. Replace the coil or change the coil wires, If the Neon indicator does not go'OFF'.

(iii).Electronic unit is faulty. Get it replaced from the factory.

(iv).Hand expansion setting is too low. Increase the hand expansion setting quarter thread per hour until the float is full of liquid. **(observe the LED display)**

(v).Ball is struck or punctured.

(b).**Neon Indicator is continuously 'OFF'**

(All LED's are glowing'ON' LED display panel.)

(i).Coil and coil wiring are faulty. Replace the coil or change the coil wires.

(ii).Electronic unit is faulty. Get replaced from the factory.

(iii).Solenoid valve might leaky. Check the coil, plunger and seat of Solenoid valve.

(iv).Ball is stuck. Clean chamber.

(c).**The ball in the float chamber is not rising.**

(Few LED's Glow-rise and fall of level is not observed)

(i).The ball must be sticking or there might be dirt accumulated on the ball or the ball must have stuck in the dirt below. Clean the dirt and other foreign matter.

(ii).The ball itself is leaky or leaking through the welding . It is recommended to ask for new one from the factory.

(d).**Fuse failure**.

(i).Check whether it is blown off.

(e**).Fuse blows OFF immediately after power ON.**

(i) Check Solenoid coil is shorted.

(ii) Check all the parallel paths of Solenoid coil supply such as Neon Indicator.

INSTRUCTION FOR INSTALLATION OF LEVEL CONTROLLER

1) INSTALLATION OF VALVES IN BOTH EQUALIZING LINE SHOULD MOUNTED SPINDLE FACING HORIZONTALLY

2) * VOLTAGE ACROSS FLOAT COIL POINT (4) AND (5) MAX.LEVEL 20V.AC = +2V.AC MIN. LEVEL 14V.AC = +2V.AC

3) 1 TO 7 NUMBERS ON CONTROL STRIP (1) PHASE ,(2) NEUTRAL, (3) EARTHING, (4) AND (5) FLOAT COIL, (6) AND (7) SOLENOID VALVE

4) (--------) THIS INDICATES THIS CONNECTION TO BE CARRIED OUT AT SITE

5) (_____) CONNECTION DONE INTERNALLY IN ELECTRONIC CONTROLLER.

6) LINE SIZE FOR GAS AND LIQUID EQUALIZING SHOULD BE 32 NB

7) THE MAXIMUM INCLINATION IS APPROXIMATELY 10°

8) SOLENOID COIL RESISTANCE 125Ω

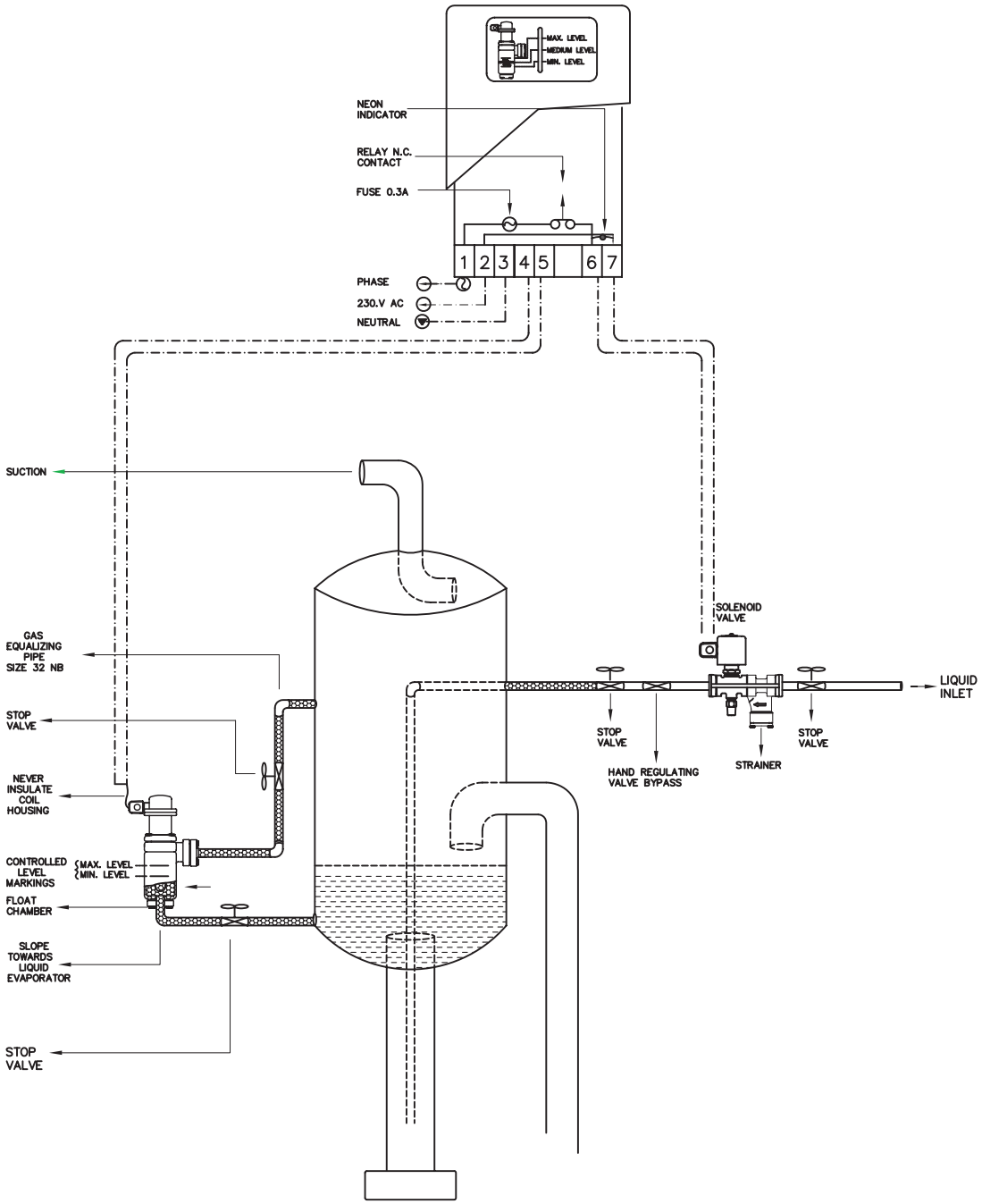
9) FLOAT COIL RESISTANCE 560Ω

10) INSULATE ALL PARTS AS SHOWN EXCEPT COIL HOUSING TO FACILATE EASY COIL REMOVAL

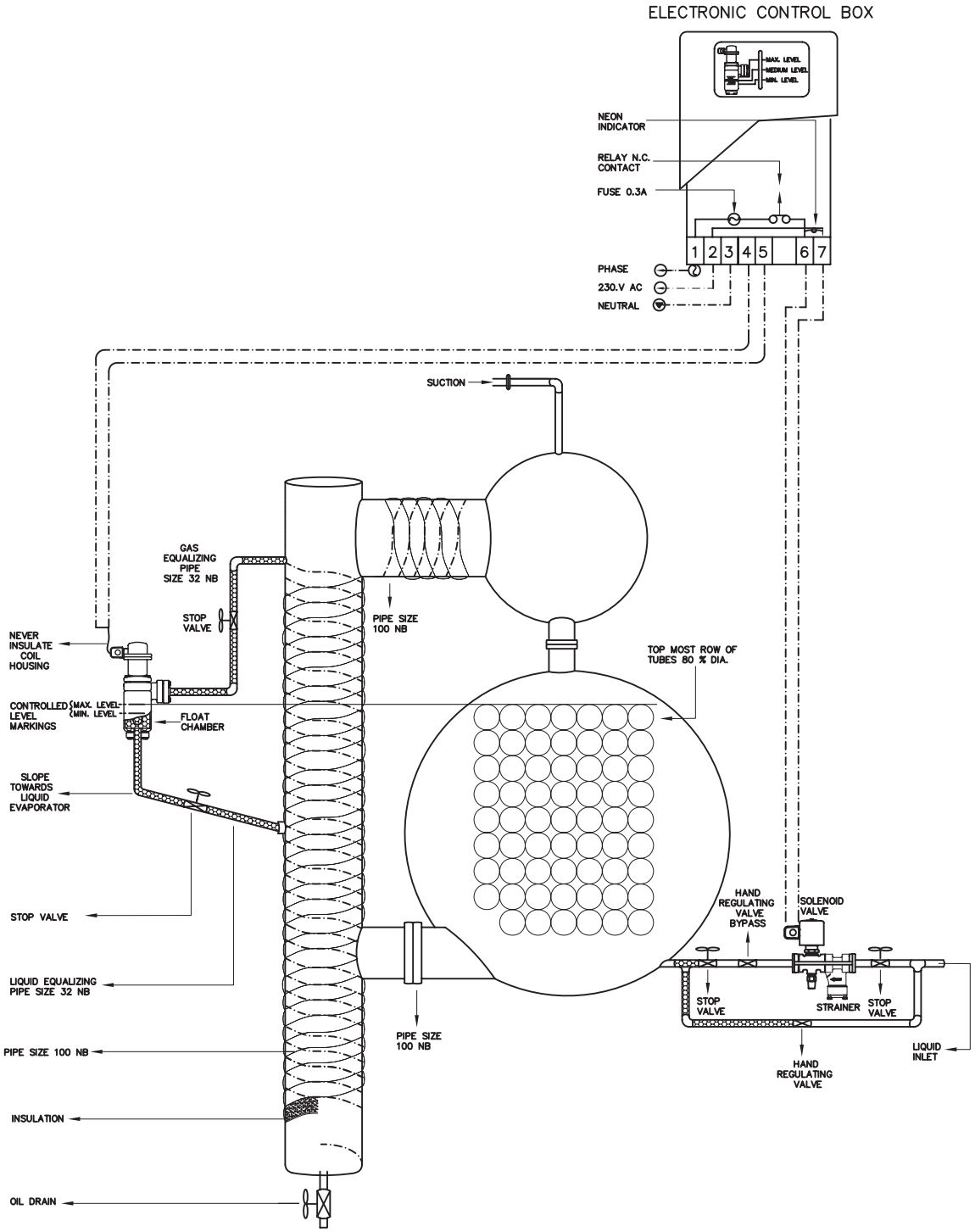
11) USE “ SUPERFREEZE ” FUSES ONLY

12) IN ANY CASE OR ANY DIFFICULTIES CONTACT “SUPERFREEZE” GURGAON

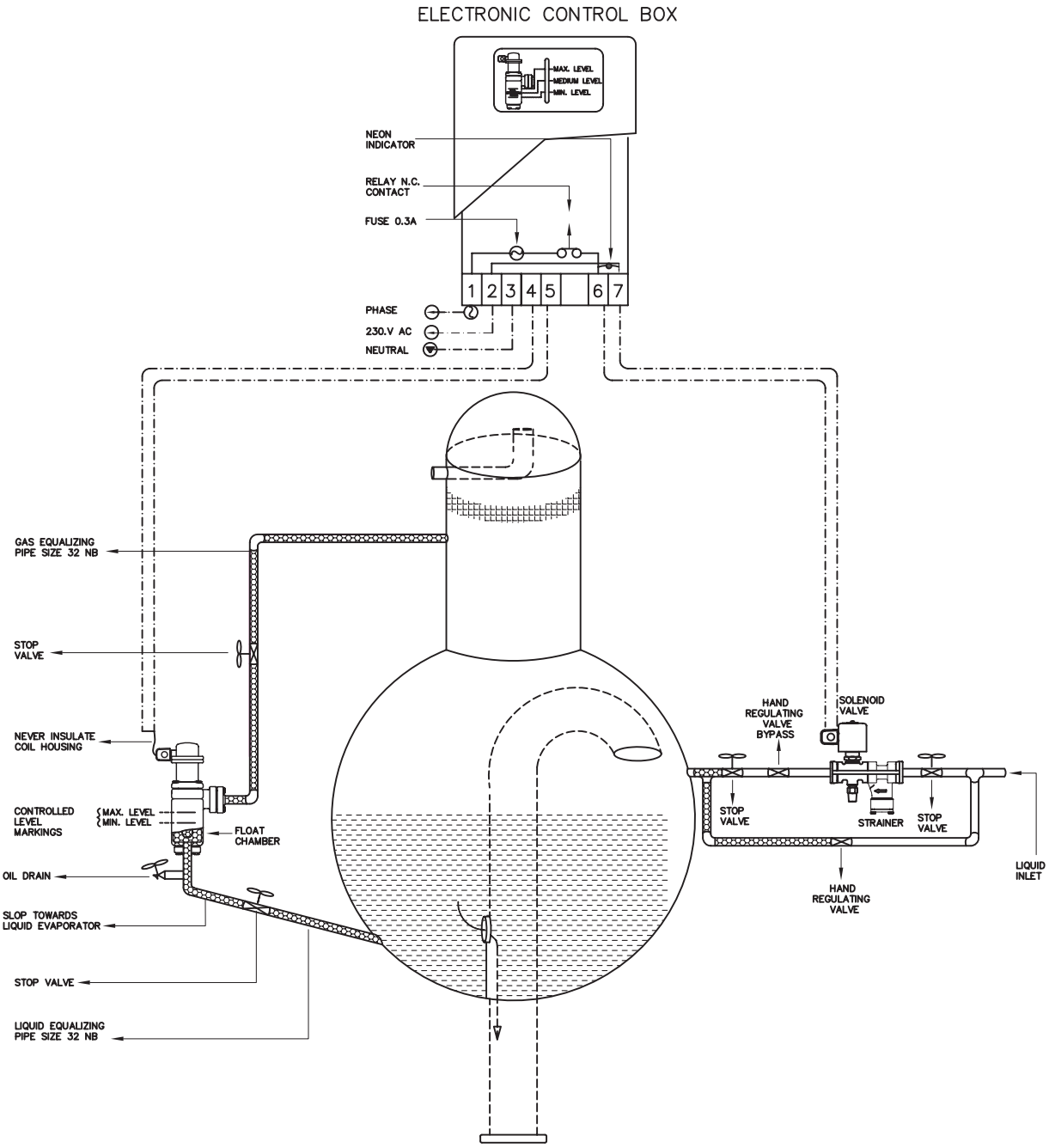
VERTICAL ACCUMULATOR



FLOODED CHILLER WITH SURGE DRUM



LIQUID SEPARATOR FOR IBT



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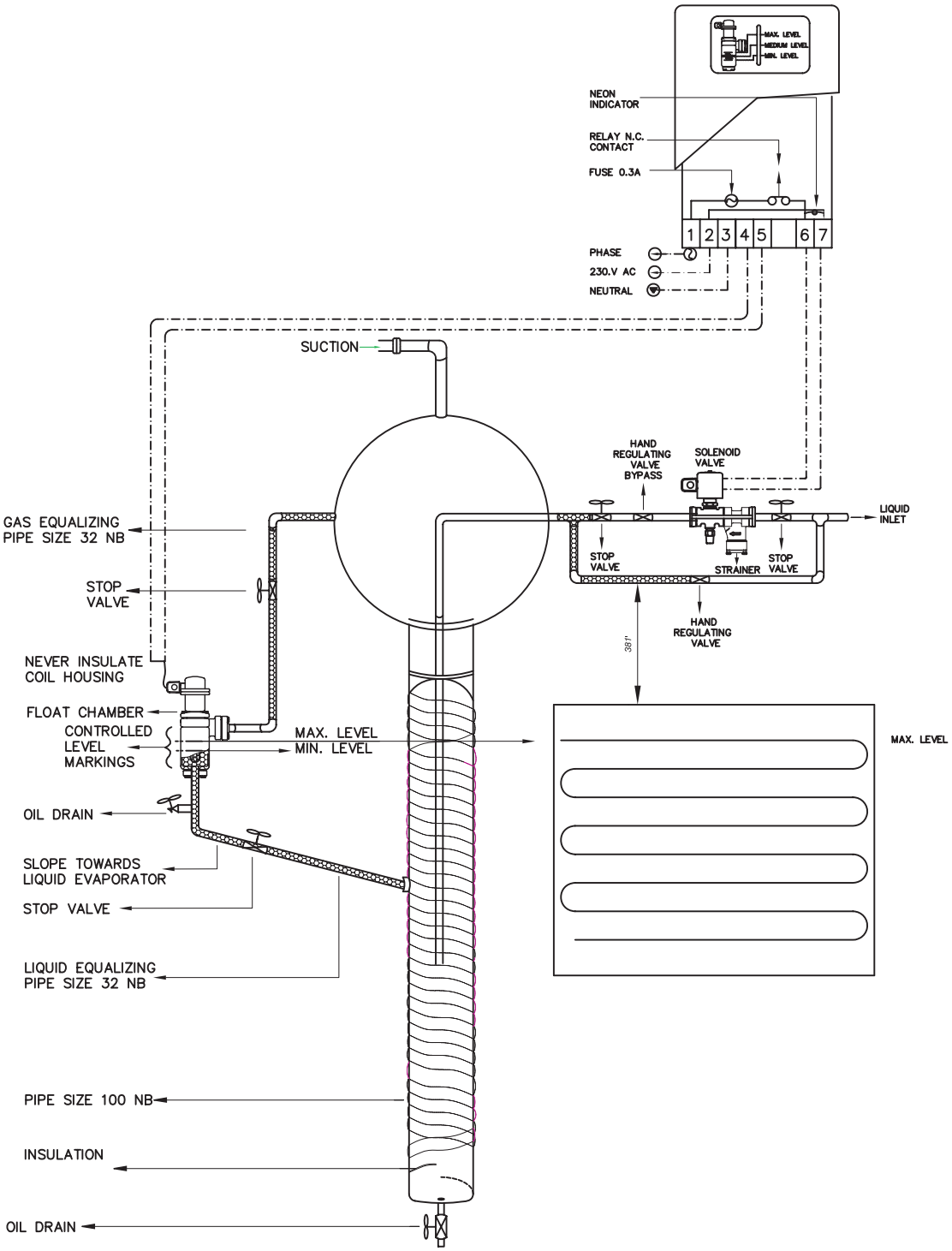
FLOODED COOLING UNIT (STD)



AMMONIA AIR COOLING UNIT